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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/679,097	10/04/2000	Tsutomu Yamada	YKI-0058	9653

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EXAMINER	
JORGENSEN, LELAND R	
ART UNIT	**PAPER NUMBER**
2675	17

DATE MAILED: 05/27/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/679,097	YAMADA, TSUTOMU	
	Examiner	Art Unit	
	Leland R. Jorgensen	2675	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *24 March 2004*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1 - 18* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1 - 18* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 103

1. The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

2. Claims 1, 2 and 10 – 12 are rejected under 35 U.S.C. 103(a) as being unpatentable over Tang et al., USPN 5,684,365, in view of Ukai, USPN 4,810,060.

Claim 1

Tang teaches a color display device in which display pixels for indicating different colors are provided in plural numbers for each color and arranged in a matrix. Tang, col. 1lines 16 – 19. The color display device comprising, corresponding to each display pixel, a self-emissive clement [EL element] for emitting light of a predetermined color; a driving thin film transistor (TFT) [power TFT (T2)] having a first end in electrical communication with the self-emissive element for supplying a drive current to the self-emissive element, and a second end in electrical communication with a power source with a constant voltage; and a switching TFT [logic TFT (T1)] having a first end in electrical communication with a data line (source line) and a second end in electrical communication with a gate of the driving TFT, the switching TFT controls whether a data signal from the data line is supplied to the gate of the driving TFT. Tang, col. 4, lines 14 – 55; col. 6, lines 9 – 20; and figure 1. Tang also teaches, "Since both the organic EL pad and the cathode are continuous layers, the pixel resolution is defined only by the feature size of the TFT and the associated display ITO pad and is independent of the organic component or the cathode of the EL cell." Tang, col. 5, lines 18 – 22.

Tang does not specifically teach that the size of the driving TFT in a display pixel for one color is altered from that in a display pixel for another color.

The specification states, "In the present invention, transistor size of a TFT refers to the ratio of the channel width W to the channel length L in the TFT channel, namely, W/L." Specification, page 10, lines 3 – 5. Ukai teaches that the W/L ratio of a power TFT in a display pixel for one color is altered from that in a display pixel for another color. Ukai, col. 3, lines 21 – 50.

It would have been obvious to one of ordinary skill in the art at the time of the invention to combine the varying W/L ratio for each color as taught by Ukai with the color display device as taught by Tang to produce a display image of good contrast regardless of the color being displayed. Each thin film transistor has a structure specific to each color to provide substantially the same light transmission-voltage characteristic for each color in the pixel. Ukai, col. 2, lines 44 – 48; col. 39 – 45; and col. 4, lines 47 – 56.

Claim 2

Tang et al. teaches an electroluminescence display that has, corresponding to each display pixel, a switching TFT 1 for controlling turning on and off of a driving TFT 2 and a current there through. Tang et al., col. 6, lines 9 – 20; and figure 1.

Claim 10

Tang et al. teaches that the self-emissive element is an electroluminescence element. Tang et al., col. 1, lines 16 – 19.

Claim 11

Neither Ukai nor Tang et al. specifically state that the size of the driving TFT is altered by changing a gate width according to emitting color while a gate length is fixed.

It would have been obvious to one of ordinary skill in the art at the time of the invention to alter the size of the driving TFT by changing a gate width according to emitting color while a gate length is fixed. Ukai invites such step.

> Such control of the ration W/L of the thin film transistor of each color can easily be effected by selecting the size of a mask which determines the ratio W/L, during the manufacture of the liquid crystal display element.

Ukai, col. 3, lines 46 – 50.

It would have been obvious to one of ordinary skill in the art at the time of the invention to control the ration W/L by fixing the gate length L while changing the gate width W.

Claim 12

For the reasons discussed in the response to claim 11, it would have been obvious to one of ordinary skill in the art at the time of the invention to control the ration W/L by fixing the gate width W while changing the gate length L.

3. Claims 3 – 9 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ukai in view of Tang et al. as applied to claim 1 above, and further in view of Rumbaugh, USPN 6,072,272.

Claim 3

Ukai teaches varying the size of the driving TFT according to the different light transmission characteristics for each color. Ukai, col. 4, lines 47 – 54; col. 4 and lines 47 – 56.

Neither Ukai nor Tang et al. specifically teach that the different light transmission characteristics for each color is the emissive efficiency of each color self-emissive element.

Rumbaugh teaches display pixels configured to compensate for the emissive efficiency of each color self-emissive element. Rumbaugh, col. 3, lines 33 – 45; and col. 4, lines 39 – 55.

It would have been obvious to one of ordinary skill in the art at the time of the invention to combine the teachings of Rumbaugh with the teachings of Ukai and Tang et al. to produce a display wherein the size of the driving TFT is determined according to an emissive efficiency of a self-emissive element connected to the driving TFT. Rumbaugh teaches the need to adjust the each pixel according to the emission efficiency of peach self-emissive element.

> In forming subpixels to have a surface area and position determined by the light emission efficiency of the particular phosphor, the invention provides a display having improved color performance.

Rumbaugh, col. 3, lines 25 – 29. Rumbaugh adds,

> To further enhance color performance, the area ratios of the red, green, and blue subpixels can be adjusted depending upon the particular phosphor, and the desired white color coordinate. In particular, the blue subpixels arrayed on the anode of a display formed in accordance with the invention have a larger surface area than either the red subpixels or the green subpixels. Additionally, the red subpixels have a greater surface area on the anode than the green subpixels. Accordingly, anodes fabricated in accordance with the invention contain a plurality of subpixels, in which the surface area of each blue subpixel in greater than the surface area of each red subpixel, and the surface area of each red subpixel is greater than the surface area of each green subpixel.

Rumbaugh, col. 3, lines 33 - 49. Although Rumbaugh teaches an relationship between the size of the pixel area and the size of the emissive efficiency, the logic would equally apply to the size of the driving TFT and the emissive efficiency.

Claim 4

Rumbaugh teaches that emissive area of a pixel having a high emissive efficiency is set smaller compared to the emissive area of a pixel connected to a self-emissive element having a low emissive efficiency. Rumbaugh, col. 4, lines 51 – 55.

Claim 5

Rumbaugh teaches that emissive area of a pixel having a high emissive efficiency is set smaller compared to the emissive area of a pixel connected to a self-emissive element having a low emissive efficiency. Rumbaugh, col. 4, lines 51 – 55.

Claim 6

Rumbaugh teaches that green has the highest emission efficiency. Rumbaugh, col. 3, lines 4 – 6; and col. 4, lines 49 – 51.

Claim 7

Rumbaugh teaches that emissive area of a pixel having a lowest emissive efficiency is set larger compared to the emissive area of a pixel connected to a self-emissive element having a high emissive efficiency. Rumbaugh, col. 4, lines 51 – 55.

Claim 8

Rumbaugh teaches that blue has the lowest emission efficiency and red has a lower emission efficiency than green. Rumbaugh, col. 4, lines 51 – 55.

Claim 9

Rumbaugh teaches that emissive area of a pixel is made successively larger as the emissive efficiency decreases. Rumbaugh, col. 4, lines 51 – 55.

4. Claims 13 - 18 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ukai and Tang et al. in view of Rumbaugh as applied to claims 1 and 3 above, and further in view of Codama et al., USPN 6,121,726.

Claim 13

Ukai, Tang et al., and Rumbaugh teach a color display device. As discussed in the rejection to claim 1, Ukai and Tang et al. teach a self-emissive element for emitting light of a predetermined color and a driving thin film transistor (TFT) connected to the self-emissive element for supplying a drive current to the self-emissive element. As discussed in the rejections to claim 1 and claim 3, Ukai and Tang et al. in view of Rumbaugh teaches that size of the driving TFT in a display pixel for one color is set for every color in accordance with the emission efficiency of the emissive element disposed at the display pixel.

Rumbaugh teaches "To further enhance color performance, the area ratios of the red, green, and blue subpixels can be adjusted depending upon the particular phosphor, and the desired white color coordinate." Rumbaugh, col. 4, line 57 – col.5, line 8.

Neither Ukai, Tang et al., nor Rumbaugh specifically teach the chromaticity of each color emitted by respective emissive element and the chromaticity of target display white of the display device.

Codama teaches the chromaticity of each color emitted by respective emissive element and the chromaticity of target display white of the display device. Codama, col. 3, lines 5 – 10.

It would have been obvious to one of ordinary skill in the art at the time of the invention to use chromaticity as taught by Codama with the color adjusted display of Ukai, Tang et al., and Rumbaugh to produce a display with pixels adjust both for the emission efficiency of each

emissive element and for the chromaticity of each color emitted by each emissive element and the chromaticity of target display white of the display device. Codama teaches,

> [I]t is preferable to regulate the respective layers in conformity to chromaticity coordinates according to the NTSC standard or the current CRT standard. Such chromaticity coordinates may be determined by use of general chromaticity coordinates measuring equipment, for instance, BM-7 or SR-1 made by Topcon Co., Ltd.

Codama, col. 3, lines 5 – 10. By regulating the pixels according to the chromaticity coordinates, the display would be most pleasant to the human eye.

Claim 14

Rumbaugh teaches that the size of emissive area of a pixel of any one color, among the display pixel of various colors, is different from the size emissive area of the display pixel of another color. Rumbaugh, col. 4, lines 51 – 55.

Claims 15 and 18

Codama teaches that the emissive element is an organic electroluminescence element comprising the emissive layer using an organic compound. Codama, col. 1, lines 10 – 14.

Claim 16

As discussed in the rejection to claim 1, Ukai and Tang et al. teach a self-emissive element for emitting light of a predetermined color and a driving thin film transistor (TFT) connected to the self-emissive element for supplying a drive current to the self-emissive element. As discussed in the rejections to claim 1 and claim 3, Ukai and Tang et al. in view of Rumbaugh teaches that size of the driving TFT in a display pixel for one color is set for every color in accordance with the emission efficiency of the emissive element disposed at the display pixel.

As discussed in the rejections to claim 13 and 14, Ukai, Tang et al., and Rumbaugh, in view of Codama, teach that size of the driving TFT in a display pixel for red, for green, and for blue is set on the basis of the emission efficiency of the emissive element of each display pixel and a luminance ratio of red to green to blue in accordance with each chromaticity of red, green, and blue emitted by respective emissive element of the display pixel, and with the chromaticity of target display white of the display device.

Claim 17

Rumbaugh teaches adds that the emissive area of the display pixel of any one color among the display pixel for red, for green, and for blue is different in size from the emissive area of the display pixel of another color. Rumbaugh, col. 4, lines 51 – 55.

Response to Arguments

5. Applicant's arguments filed 24 March 2004 have been fully considered but they are not persuasive.

The critical issue in this case is that the claims and Tang teach a driving TFT for a self-emissive element. Ukai, however, teaches a TFT for a liquid crystal display pixel, specifically for the colored filters of a liquid crystal display. Ukai, col. 4, lines 47 – 56. Would it have been obvious to one of ordinary skill in the art at the time of the invention to combine the teaching of Ukai about the relationship between the size of a TFT and color of a filter as applied to a pixel for a liquid crystal display, with the TFT-EL display as taught by Tang? That is, would it have been obvious to one in the art to apply a technique developed for a TFT for a pixel of a liquid crystal display to a TFT for a pixel for an electroluminescent or other self-emissive display?

A prior art reference must either be in the field of applicant's endeavor or, if not, then be reasonably pertinent to the particular problem with which the applicant was concerned, in order to be relied upon as a basis for rejection of the claimed invention. See *In re Oetiker*, 977 F.2d 1443, 24 USPQ2d 1443 (Fed. Cir. 1992). In this case, it well know in the art to apply the teachings about a TFT for driving a pixel of a liquid crystal display to a TFT for driving a pixel of an electroluminescent display. Much of the teachings that apply to the TFT for a liquid crystal display also apply to an electroluminescent display. See e.g. Sasaki et al., USPN 5,818,068, col. 14, lines 42 – 53, col. 21, lines 11 - 24; Yamazaki et al., USPN 5,888,858, col. 11, lines 21 – 25; Sano et al., USPN 6,252,248 B1, col. 8, lines 20 – 44; and Sano et al., USPN 6,628,363 B1, col. 10, lines 9 – 25.

The problem to be solved by both the colored self-emissive element and the colored LCD filters is that each color responds differently to the power applied. In Ukai, the invention solved the problem by varying the size of the power TFT supplying the color filter. In the claims and specification, the invention solves the problem by varying the size of the power TFT supplying the self-emissive element. Examiner find unpersuasive applicant's argument that the TFT described by Ukai is a switching TFT not a driving TFT. Both the driving TFT in the claims and Ukai's TFT serve the same function of providing power to change the state of the pixel element.

Conclusion

6. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Leland Jorgensen whose telephone number is 703-305-2650. The examiner can normally be reached on Monday through Friday, 7:00 a.m. through 3:30 p.m..

Any response to this action should be mailed to:

Commissioner of Patents and Trademarks
Washington, D.C. 20231

or faxed to:

(703) 872-9306

Hand-delivered responses should be brought to Crystal Park II, 2121 Crystal Drive, Arlington, VA, Sixth Floor (Receptionist).

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the Technology Center 2600 Customer Service Office, telephone number (703) 306-0377.

lrj

DENNIS-DOON CHOW
PRIMARY EXAMINER